TEWKESBURY ABBEY CHURCH.

VIEW FROM THE WEST.*

ON ARCHITECTURAL SHADOWS.

BY T. S. DAVIES, F.R.S.
PROFESSOR OF DESCRIPTIVE GEOMETRY IN THE COLLEGE FOR CIVIL ENGINEERS, PUTNEY.

SIR,—I perceive with regret that you have inserted a paper on this subject, in which the character of the problem seems misapprehended.† May I, therefore, beg of you, for the sake of your student-readers, to insert also the following, where the problem is taken in all the generality of which it is susceptible? It will appear from what is here given, that whatever be the direction of the rays of light, the problem is equally simple (both in theory and in practice) with that particular case ordinarily employed by architects, viz., when the rays are parallel to the diagonal of a cube, two of whose faces are parallel to the plan and elevation of the drawing.

The present solution has reference alone to finding the shadows on the plan and elevation; as, to develop the general problem of shadows with any degree of completeness, would require more space than you could afford, and probably more time than I could just now command.

As the DESCRIPTIVE GEOMETRY is the *true* foundation of the entire process of shadows and shadowing, and as there is no English book to which I could satisfactorily refer the reader, I have been obliged to occupy a considerable portion of this paper with mere preliminaries, which I should have wished, had it been practicable, to avoid.

If it should be compatible with your plan to allow me sufficient space, at some future and not very distant period, I shall be glad of the opportunity of rendering the subject tolerably complete. Should it, however, not be in accordance with your views, do not scruple to say so, as my work on descriptive geometry, when published, will, at all events, place the theory and practice of this, as well as other applications of Monge's general methods, within the reach of my professional countrymen.—I am, Sir, &c.,

T. S. DAVIES.

Charlton, Kent, July 24th, 1846.

In the solution of this problem, in its utmost generality, only the very simplest principles of descriptive geometery are required; but as no work that can be referred to in England contains the development of those principles in a truly scientific form, it will be necessary to premise the propositions which we shall require in the solution.

I. A point or a line, as every architectural student knows, is given when its projections on the plan and elevations are given; these planes occupying their true places at right angles to each other.

In the annexed figures, the *eidograph*, or representation of the system of lines, is a rude sketch of the planes and lines which occur in the problem, drawn after the manner of Euclid's eleventh book; and the *orthograph* is the result of supposing a total removal of all the parts of the eidograph except those which lie in the plan, XY, and elevation, XZ; the elevation plane, XZ, being also revolved about the ground line, OX, into coincidence with the plan XY. Figs. 1 and 2.

Now in the eidograph, let A be any point; and let perpendiculars, Aa_1, Aa_2, be drawn to the plan and elevation respectively. Then the plane, a_1Aa_2, will be perpendicular to both the planes, XY and XZ (*Euc. xi.* 18), and hence (*xi.* 19) perpendicular to OX, and, finally, (*conc. xi.* 4) the lines a_1a and a_2a are also perpendicular to OX.

Again, a_2a being in a plane XZ perpendicular to XY, and at right angles to the common section OX, it is perpendicular to the

* See p. 378. † P. 176, *ante*.